

## **II. Remarks**

### **A. Status of the Claims**

Claims 1-10 and 17-42 were pending at the time of the Action. Claims 1, 5, 17, 23, 26, 31, and 36 have been amended in the amendment contained herein, and claim 27 has been canceled. Support for these amendments may be found in the specification at, for example, page 3, lines 27-29, and page 4, lines 7-8. Therefore, claims 1-10, 17-26, and 28-42 are now pending.

### **B. The Claims Are Non-Obvious**

The Action raised four rejections under 35 U.S.C. 103(a). Claims 1-4, 6-10, 17-22, 24-25, 36-39, and 41-42 were rejected as obvious over US Pat. No. 6,436,174 to Grossmann, et al. (“Grossmann”). Claims 5, 23, and 40 were rejected as obvious over Grossmann in view of a reference by Bishnoi and Rochelle (“Bishnoi”). Claims 26-31 and 33-35 were rejected as obvious over US Pat. No. 5,853,680 to Ijima (“Ijima”). Claim 32 was rejected as obvious over Ijima in view of Grossmann. Applicants traverse there rejections.

- 1. Claims 1-4, 6-10, 17-22, 24-25, 36-39, and 41-42 are not obvious over Grossmann.*

As an initial matter, Applicants note that while the Action states at ¶3 that “Claims 1-4, 6-22, 24-30, 32-39, and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossmann,” it appears from ¶¶4-27 that the Office only intended to reject claims 1-4, 6-10, 17-22, 24-25, 36-39, and 41-42 as obvious over Grossmann alone (note that claims 11-16 were canceled in the previous response).

While Applicants disagree with the Action’s conclusion that claims 1-4, 6-10, 17-22, 24-25, 36-39, and 41-42 are obvious over Grossmann, in the interest of advancing the prosecution, Applicants have amended independent claims 1, 17, 26, and 36 herein such that they now recite “wherein no monohydric or polyhydric alcohol is added to the solution.” Nowhere does

Grossmann disclose a composition that contains no added monohydric or polyhydric alcohol. Rather, every composition disclosed in Grossmann contains as “component B” either 1 to 60% by weight, 2 to 45% by weight, or 3 to 35% by weight of a monohydric or polyhydric alcohol. *See* Grossmann at Abstract; col. 2, lines 6-7; col. 2, lines 66-67; col. 3, lines 1-2; col. 3, lines 51-67; and col. 4, lines 15-32.

Moreover, Grossmann explicitly teaches away from compositions that do not contain a monohydric or polyhydric alcohol, explaining that the solubility of component A in the absorption medium of that invention in the presence of a monohydric or polyhydric alcohol is “markedly higher” than the solubility of component A in absorption mediums that do not contain such alcohols. *See* Grossmann at col. 4, lines 15-23. As explained at page 6, lines 3-10 of Applicants’ disclosure, contrary to the teachings of references such as Grossmann, Applicants discovered a solvent containing an alkali salt such as potassium carbonate and a polyamine such as piperazine (PZ) in concentrations **such that no additional alcohols are required for increasing solubility of the PZ.**

For at least these reasons, claims 1-4, 6-10, 17-22, 24-25, 36-39, and 41-42 are not obvious over Grossmann. Therefore, Applicants respectfully request the withdrawal of this rejection.

2. *Claims 5, 23, and 40 are not obvious over Grossmann in view of Bishnoi.*

Claims 5, 23, and 40 depend from independent claims 1, 17, and 36, respectively. Therefore, for at least the reasons explained above with regard to claims 1, 17, and 36, claims 5, 23, and 40 are not obvious over Grossmann, and Applicants respectfully request the withdrawal of this rejection.

3. *Claims 26-31 and 33-35 are not obvious over Ijima.*

The Action concedes at ¶37 that Ijima does not teach the particular amine and alkali salt concentrations recited in the claims (note that the claimed amine concentrations have been amended herein). The Action attempts to rectify this deficiency in Ijima by asserting that “it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust these concentrations in order to optimize performance.” Applicants respectfully dispute the Action’s stated rationale for modifying Ijima, as it would **not** have been obvious to use the claimed concentrations of amine and alkali salt due to the lack of a reasonable expectation of success. *See* MPEP § 2143.02 (“The prior art can be modified or combined to reject claims as prima facie obvious **as long as there is a reasonable expectation of success.**”) (emphasis added).

As explained at page 8 of the specification, it had been thought previously that concentrations of piperazine (PZ) greater than 1.3 m cannot be used in a CO<sub>2</sub>-rich environment due to the formation of piperazine carbamate that precipitates from the solution. *See*, e.g., U.S. Pat. No. 4,336,233 at col. 3, lines 7-18 (stating that “the use of piperazine alone as the washing agent is of limited applicability . . . [because] larger amounts than 1.3 mole / l cannot be used because in the presence of CO<sub>2</sub> . . . the carbamate of piperazine precipitates . . .”). Furthermore, the claimed concentrations of polyamine had been thought infeasible due to amine volatility. However, Applicants discovered the surprising and unexpected result that greater concentrations of polyamines are feasible in a CO<sub>2</sub>-rich environment without precipitation of solids and/or evaporation of the amine when used with certain concentrations of alkali salts because the interaction of the alkali with the amine and the CO<sub>2</sub> avoids solid precipitation and reduces the volatility of the amine, especially with PZ.

For at least these reasons, claims 26-31 and 33-35 are not obvious over Ijima. Therefore, Applicants respectfully request the withdrawal of this rejection.

4. *Claim 32 is not obvious over Ijima in view of Grossmann.*

Claim 32 depends from independent claims 26. Therefore, for at least the reasons explained above with regard to claim 26, claim 32 is not obvious over Ijima in view of Grossmann, and Applicants respectfully request the withdrawal of this rejection.

**C. Conclusion**

In light of the foregoing, Applicants respectfully submit that all claims are in condition for allowance. The Examiner is invited to contact the undersigned with any questions, comments, or suggestions relating to the referenced patent application.

Respectfully submitted,

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